Exploration of four sternalis muscles: An exclusive finding
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Abstract

Introduction
The sternalis muscle is quite unknown among clinicians and radiologists although this anatomical variant of anterior thoracic region musculature is well demonstrated. The aim of this case report is to disseminate the awareness of this rare finding among clinicians, anatomists and medical students.

Case Report
During a routine dissection we found a bilateral sternalis muscle, complete on left side and three distinct sternalis muscles on the right side. Nerve supply to left side was provided by medial pectoral nerve. Morphometric analysis and pictorial documentation of anatomical landmarks was done.

Conclusion
Presence of sternalis may alter the depth required for radiation of the mammary lymph node during radiation therapy. The occurrence of three sternalis muscle on the right side may provide a novelty in the anatomy of sternalis.

Introduction
Sternalis is also known as musculus sternalis, presentalis, rectus sternalis, sternalis brutorum or thoracicus and was mentioned earlier by Carbolius in 1604. There are various schools of thought regarding origin of this muscle. It is considered as phylogenetic remnant derived from primates whereas few deny this description. Presence of sternalis as unilateral or bilateral is also debated. As per the previous literature, unilateral sternalis is twice as common as bilateral sternalis but some have reported equal incidence.

Discussion
Incidence of sternalis has been reported as 4.5% unilaterally and less than 1.7% bilaterally. We noticed three different sternalis on the right pectoral region. These findings are unique and have not been reported anywhere to our knowledge. On the left side, it was a complete muscle providing attachments at the external oblique aponeurosis and tendon of the sternocleidomastoid. Harish & Gopinath observed that sternalis was innervated by the medial pectoral nerve.

Figure 1: Image of three distinct sternalis muscles running parallel to each other on right pectoral region.
Our results were consistent with Harish & Gopinath. In the present case, the medial pectoral nerve provided a twig to the left sternalis. Dimensions provided by Loukas\(^8\) are: maximum length as 144mm, shortest as 20mm, maximum width as 26mm whereas minimum width as 2.5mm. We have noticed much larger dimensions in terms of length as 192mm on left side and 144mm on the right side\(^1,4,7,10\). According to Kulkarni and Kulkarni\(^12\), sternalis is the remnant of “panniculus carnosus” explained by its position just superficial to the pectoral fascia and supplied by anterior cutaneous branches of the intercostals nerves. We observed innervations of the left sternalis by the medial pectoral nerve in the present case.

A strong association of sternalis with anencephalic foetuses (48%) was noticed and we tried to correlate it with neurological abnormalities\(^16\). Its functional significance is not clearly defined. According to Bardley et al., 4/32000 women that underwent mammograms showed an irregular structure along the sternum which made the diagnosis difficult and unclear. CT/MRI further confirmed this irregular structure as sternalis and ruled out any possibility of neoplasia\(^13\).

**Conclusion**

Presence of sternalis may alter the depth required for radiation of the mammary lymph node during radiation therapy. The occurrence of three sternalis muscle on the right side may provide a novelty in the anatomy of sternalis.

**References**